

Cave Research Projects Help Promote Diversity in the Geosciences

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Data from the National Science Foundation indicates that the geosciences have lower ethnic and racial diversity than any other science, technology, engineering and mathematics (STEM) discipline. Increasing the diversity of the geoscience workforce will benefit the discipline by providing scientists with different backgrounds, approaches and perspectives. A diverse geoscience workforce is essential to helping society understand and respond to increasingly complex geoscience issues, especially with regards to topics of concern for different racial, ethnic and cultural groups.

This paper reviews how a partnership between Tennessee State University (a minority serving institution), the U.S. Geological Survey, and Mammoth Cave National Park engaged students in scientific research and increased the number of students pursuing employment or graduate degrees in the geosciences. The projects focused on water resources in a karst terrain, such as parking lot runoff and filter efficiency, groundwater recharge and chemical transport, quantitative tracer studies, karst hydrology model development, geophysical logging, emergency spill response, geochemistry and geomicrobiology. These projects used a variety of geoscience tools and methods, including field data collection, geographic information system, chemical and biological analysis, hydrologic instrumentation, modeling and experimentation.

Twenty-two students (12 male, 10 female) participated in karst research projects from 2007 to 2015. They represented majors in environmental engineering, mathematical, chemistry and biological sciences. Each of the 22 students completed significant research and presented their results at a regional or national conference. Of the 22 student researchers,

three are still undergraduates, two accepted jobs after completing their bachelors, 16 went on to masters programs with thesis projects that emphasized earth science themes, and four students continued into Ph.D. programs (three geoscience majors and one physics major). Of the fourteen students that have completed their academic studies, all but four are currently employed in the geoscience or environmental engineering profession.

When the students were asked what influenced them to pursue a career in the geoscience profession, the overwhelming response was their research experiences that exposed them to earth and environmental scientists. The research experience demonstrated the relevance of the discipline, such as water quality studies and environmental protection. The research and professional meetings also provided an opportunity for the students to learn of employment opportunities, make professional connections, and feel like they could make a difference pursuing a career in geosciences. Another benefit of the student research was the financial assistance, which reduced the need to work off campus. It is clear from these results that engaging underrepresented students in geoscience research projects helps promote diversity.

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